

# SERVICE ADJUSTMENTS-CHASSIS ALIGNMENT

## Service Menu

The service menu is provided to facilitate instrument alignment and service adjustments. The service menu is accessed by pressing two combinations of buttons on the instrument front control panel keyboard. With the instrument "ON" press and hold the "VOL -" button and then in sequence press and release the "CH +" button and the "CH -" button. The TV set should immediately display a one-line menu on the bottom of the screen (see fig. 1).

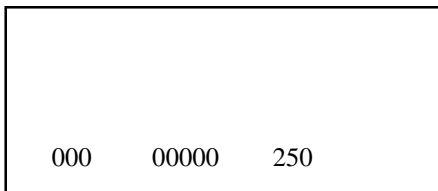


Fig. 1- Service Mode Display

To enter the required service parameter, press and hold the "VOL +" button (either on the remote control or the instrument front panel) until the three digits on the right of the screen show 076 (see fig. 2).

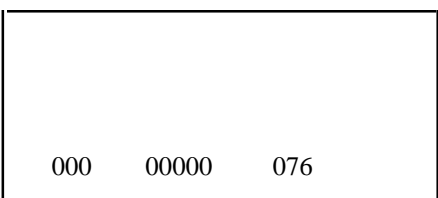


Fig. 2 - Security Parameter entrance code.

The group of zero's in the center of the service menu display will show the parameter # while the three zero's to the right provides the value range (see fig. 3).

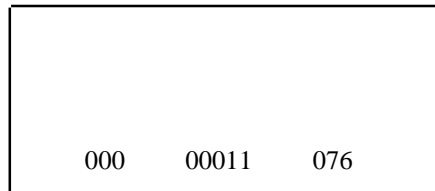


Fig. 3 - Parameter # and value range.

The number in the center is the parameter number and the number on the right is the current value of that parameter. The "CHAN UP (+)" and the "CHAN DN (-)" buttons (either on the remote control or the instrument front control panel) increment or decrement the parameter number. The "VOL UP (+)" and the "VOL DN (-)" buttons (either on the remote control or the instrument front control panel) adjust the current value of the selected parameter. There is only one parameter category. It is used for security reasons to protect the factory alignments and preset adjustments from being modified by the user. To exit the service menu press the power button either on the remote or the TV front panel

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## ALIGNMENT (I-F)

### I-F Video Reference Filter (VCO)

1. Apply a 45.75MHz. signal from an external marker generator, with 20mV output level, to the TV I-F OUTPUT (pin 11 of Tuner, NH01).
2. Access service menu and select VCO alignment (parameter 01). See service menu access this service data.
3. Adjust VCO register using the "VOL +" and "VOL -" buttons, either on the remote control or instrument front panel, until the first three digits on the screen show "111" indicating that the AFC voltage is within the aligned range.

### R-F AGC

The R-F AGC has been preset at the time of manufacture for optimum operation over a wide range of R-F signal input conditions. Readjustment should not be required unless the tuner has been repaired, IC IV01 or IC IR01 has been replaced.

Adjustment of the R-F AGC parameters may not have any visible effect except under unusual conditions. Adjusting the R-F AGC to one extreme of its parameter limits will usually

provide a relatively poor signal to noise ratio, while adjustment to the other extreme of its parameter limits will cause overload conditions such as channel 6 color beats or Cable TV adjacent channel interference. If the R-F AGC parameter setting is adjusted, check all local channels for proper operation. Use the weakest local channel to adjust R-F AGC parameter setting.

1. Tune TV to weakest local station.
2. Access service menu and select AGC alignment parameter (02). See service menu access this service data.
3. Note value range setting prior to making any adjustments. This so that you may reset to that value if no visible difference is detected when adjusting from one extreme of the parameter limits to the other.

### 4.5 MHz Trap

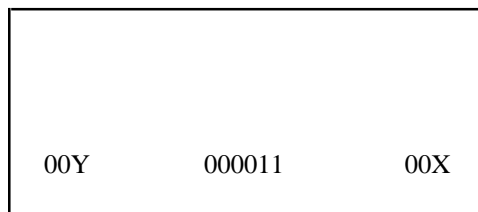
1. Tune to a strong local TV station.
2. Adjust L104 for maximum audio output with minimum distortion.

**SERVICE ADJUSTMENTS (Continued)**

**SERVICE MENU CHART**

Parameter #	Parameter Name	Value Range	Notes and Comments
00	Security Number	Must be 076	Cannot advance to other parameters until value is set.
01	VCO	00 - 127	
02	AGC	00 - 63	
03	Red Bias	00 - 255	
04	Green Bias	00 - 255	
05	Blue Bias	00 - 255	
06	Green Drive	00 - 255	
07	Blue Drive	00 - 255	
08	Peak White	00 - 52	
09	Horizontal Phase	00 - 31	
10	Vertical Amplitude	00 - 63	
11	Vertical Phase	00 - 07	The first three digits will toggle between 000 and 001. The total range is 15 steps (see Note 1 and fig. 4).

**NOTE 1:** "Y" will remain at 0 when "X" increases from 0 to 7. For the 8 to 15 range , "Y" is toggled to 1 and "X" increases from 0 to 7 again (see fig. 4).



*Fig. 4 - Vertical Phase toggeling*

## SERVICE ADJUSTMENTS (Continued)

### Peak White (Video Level)

1. Access service menu and select parameter #08 (see service menu access this service data).
2. Connect color bar generator to antenna input and TV tuner to channel 3 (or 4) depending on output frequency of generator.
3. Connect oscilloscope to base of video buffer TI20.
4. Adjust value range reading to produce a 2.0 volt p-p (sync to white) response.

### Horizontal Phase (Centering)

1. Access service menu and select parameter #09 (see service menu access this data).
2. Adjust value range to center picture horizontally (side to side) use "VOL +" button to increase value range and use "VOL -" button to decrease value range.

### Vertical Phase (Centering)

1. Access service menu and select parameter #11 (see service menu access this data).
2. Adjust value range to center picture vertically (top to bottom) use "VOL +" button to increase the value range and use the "VOL -" button to decrease the value range.

### Vertical Amplitude (Height)

1. Access service menu and select parameter #10 (see service menu access this data).
2. Adjust value range so that the picture just fills the screen top to bottom. Use the "VOL +" button to increase the value range and use the "VOL -" button to decrease the value range.

### VG2 ( Screen Voltage)

1. Set picture controls at nominal, brightness and color at 50% and contrast at 70%.
2. Connect a NTSC generator to antenna terminals and display a 10 step grey scale pattern. Adjust VG2 (screen control) until the second greyscale bar is just visible.

### White Balance Adjustment

Test Point	Observe Display	
Adjust:	RDC,GDC	Digital
	G'DRV,B-DRV	Digital

1. Set all customer controls to midrange.
2. Tune in a grey scale test pattern.
3. Place the instrument in the setup mode.
4. Adjust the *RDC* and *GDC* for grey tone on the first four steps of the grey scale.
5. Adjust the *GDR V* and *BDR V* for white level on the last four steps of the grey scale.

### Focus

1. Set picture controls to nominal, brightness and color at 50% and contrast at 70%.
2. Adjust focus control LL05 for best overall focus.

### Purity Adjustment

#### Notes

1. This procedure *does not* apply to instruments with bonded tube/yoke assemblies. Do *not* attempt to remove the yoke from a bonded assembly. Refer to **Replacement Parts** for replacement part information.
2. Do not remove any trim magnets that may be attached to the bell of the picture tube.
3. For best results, the instrument should be at room temperature for six (6) hours and be operating at low beam current (dark screen) for 30 minutes before performing the following adjustments.

#### Procedure

1. Tune the instrument to receive a flat white field. Turn the instrument off and remove AC power.
2. Loosen the yoke locking screw and slide the yoke away from the bell of the picture tube. If the tube/yoke has a tape beam bender, remove it and replace it with an adjustable beam bender (follow instructions provided with the replacement beam bender).
3. Temporarily remove the yoke wedges and slide the yoke completely forward to the bell of the picture tube.
4. Loosen the beam bender locking ring(s) and position the adjustment tabs at the 12 o'clock position.
5. Place the instrument so that it faces North and externally degauss the entire picture tube.
6. Reconnect AC power and turn the instrument on (for internal degauss). Turn the instrument off and disconnect the degaussing coil from the Main PCB.

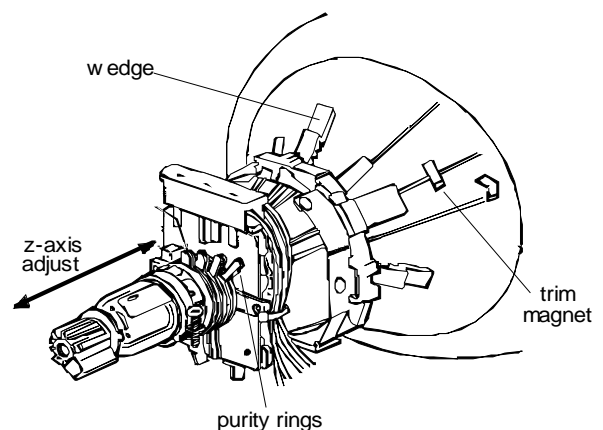


Fig. 5 - TubelYoke Assembly

7. Turn the instrument on and tune to receive the flat field signal. Enter the setup mode and adjust the *Bias* and *Drive* controls to obtain a red raster.

## SERVICE ADJUSTMENTS (Continued)

- Using double-sided tape, attach two round magnets to the face of the picture tube at 3 o'clock and 9 o'clock.
- Adjust the yoke z-axis (see Fig. 5) to balance the upper two (blue) registration circles.
- Adjust the purity rings (see Fig. 6) to balance all four (blue and green) registration circles.
- Tighten the yoke clamp screw and remove the two magnets from the face of the picture tube.
- Turn the instrument off and remove AC power. Reconnect the degaussing coil.
- Rotate the instrument so that it faces South.
- Reconnect AC power and turn the instrument on (for internal degauss). Turn the instrument off and disconnect the degaussing coil from the Main PCB.
- Turn the instrument on and recheck the purity alignment with the round magnets. If all four (blue and green) registration circles are balanced, then the alignment is complete. If not, repeat steps 9 and 10 with the instrument facing South.

### Convergence Adjustment

#### Notes

- This procedure *does not* apply to instruments with bonded tube/yoke assemblies. *Do not* attempt to remove the yoke from a bonded assembly. Refer to **Replacement Parts** for replacement part information.
- Do not remove any trim magnets that may be attached to the bell of the picture tube.
- For best results, the instrument should be at room temperature for six (6) hours and be operating at low beam current (dark screen) for 30 minutes before performing the following adjustments.

#### Procedure

- Tune the instrument to receive the crosshatch test signal.
- Turn the instrument off and remove AC power. Disconnect the degaussing coil.
- Reconnect AC power and turn the instrument on.
- Enter the setup mode. Preset the *Bias* controls to minimum and preset the *Drive* controls to midrange. Rough adjust the *Screen* control for a dark black background. Rough adjust the *Bias* controls for white crosshatch lines. Rough adjust the Focus control for good focus at the center of the display.

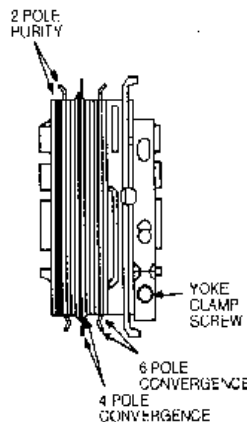
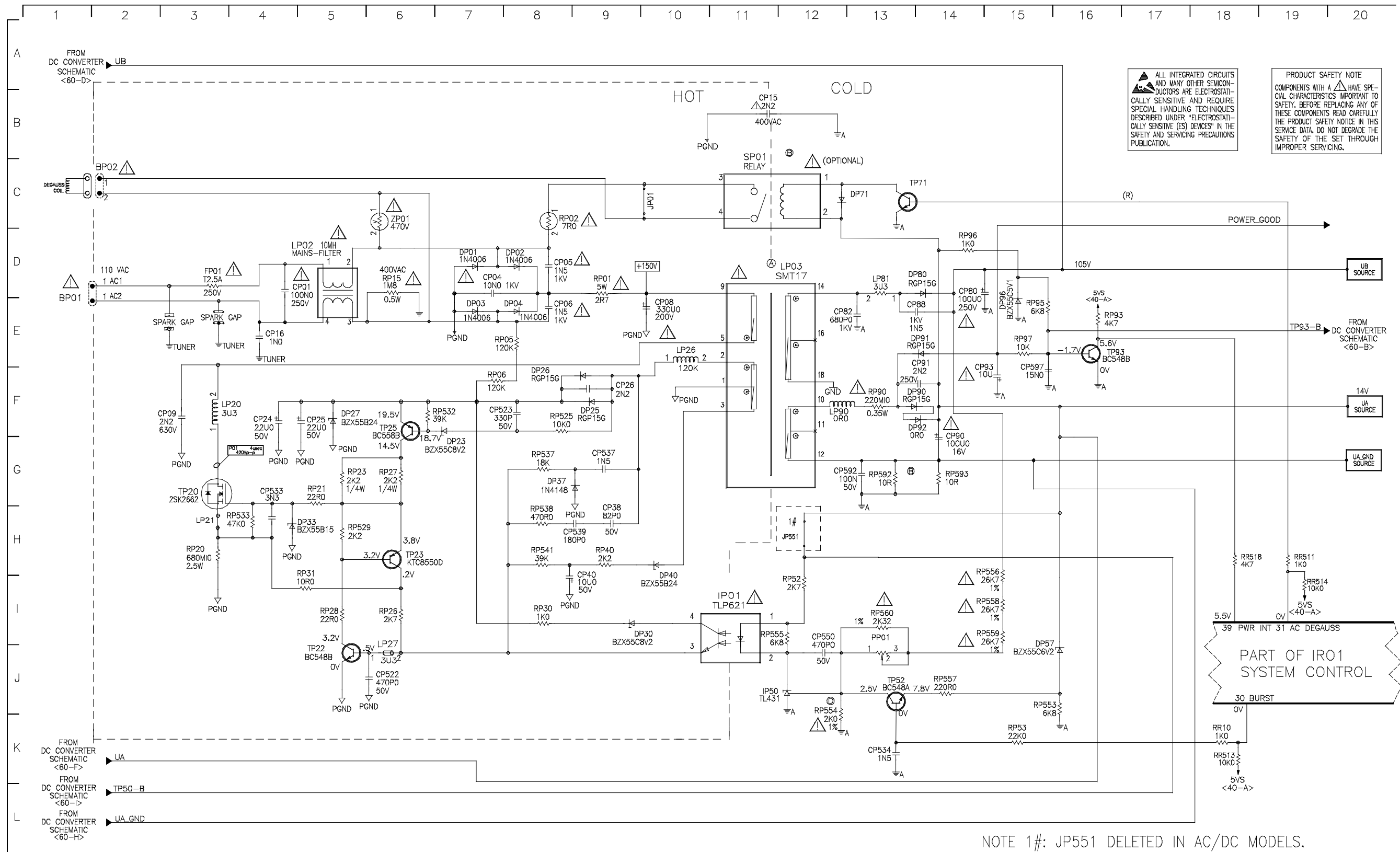
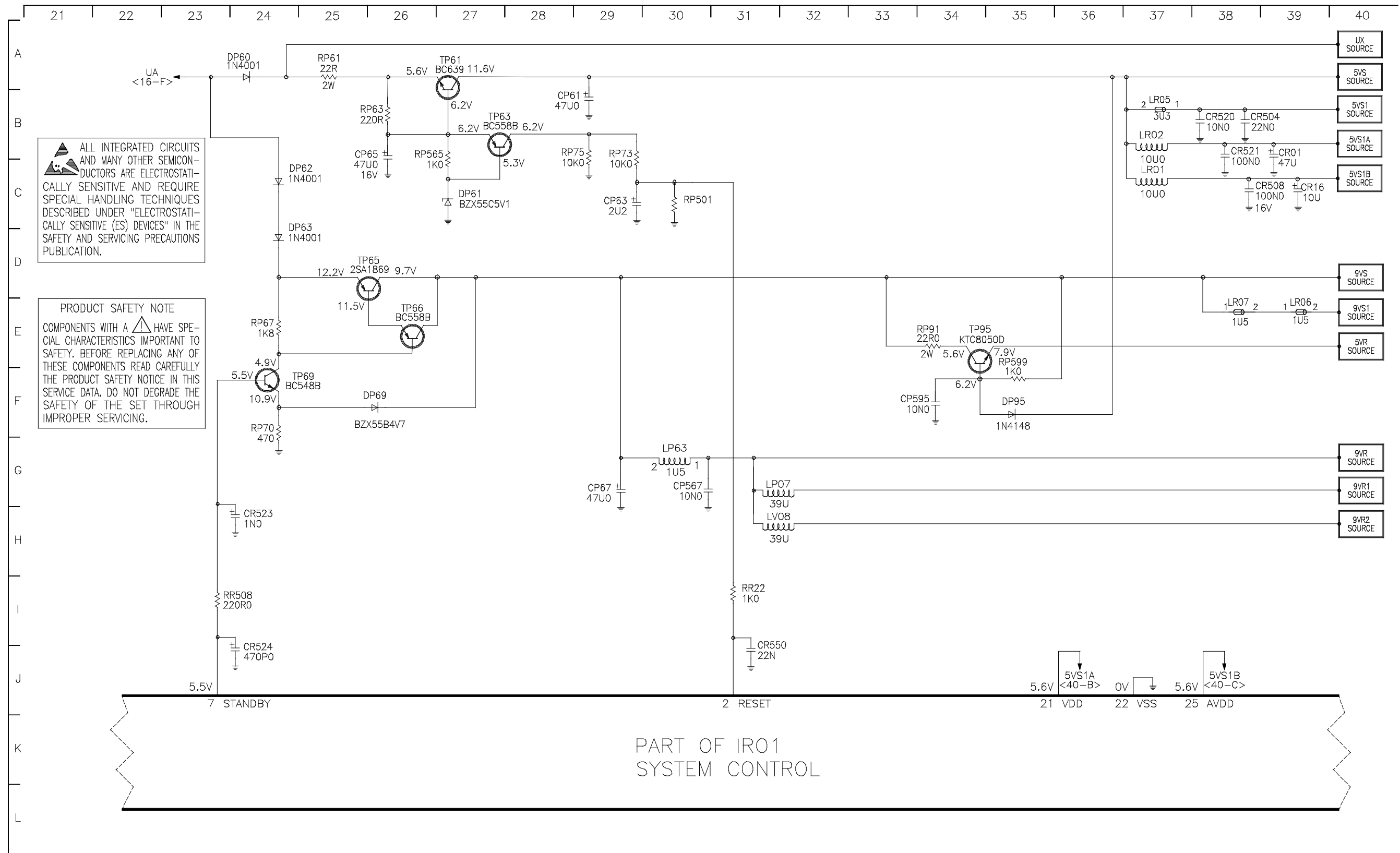



Fig. 6 - Purity and Convergence Magnets

- Turn the instrument off and remove AC power. Reconnect the degaussing coil.
- Reconnect AC power and turn the instrument on. Using the Picture menu, set contrast to maximum, brightness and sharpness to midrange, and color to minimum.
- Temporarily remove the yoke wedges.
- Loosen the beam bender locking ring(s) and position the adjustment tabs at the 12 o'clock position.
- Converge the red and blue vertical lines to the green vertical line at the center of the screen:
  - Carefully rotate both tabs of the 4-pole ring magnet (simultaneously in opposite directions) from the 12 o'clock position to converge the red vertical line with the blue vertical line.
  - Carefully rotate both tabs of the 6-pole ring magnet (simultaneously in opposite directions) from the 12 o'clock position to converge the magenta (red/blue converged) vertical line with the green vertical line.
- Converge the red and blue horizontal lines to the green horizontal line at the center of the screen:
  - Carefully rotate both tabs of the 4-pole ring magnet (simultaneously in the same direction to maintain the spacing between the tabs) from the 12 o'clock position to converge the red horizontal line with the blue horizontal line.
  - Carefully rotate both tabs of the 6-pole ring magnet (simultaneously in the same direction to maintain the spacing between the tabs) from the 12 o'clock position to converge the magenta (red/blue converged) horizontal line with the green horizontal line.
- Secure the 4-pole and 6-pole magnets by tightening the beam bender locking ring.
- While viewing the 6 o'clock and 12 o'clock areas on the screen, rock the front of the yoke vertically (up/down) to converge the red and blue vertical lines. Temporarily place a wedge at the 12 o'clock position to hold the vertical position of the yoke.
- Check the 3 o'clock and 9 o'clock areas to confirm that the red and blue horizontal lines are converged. If the lines are not converged, slightly offset the vertical tilt of the yoke to balance the misconvergence of the horizontal lines at 3 o'clock and 9 o'clock with the misconvergence of the vertical lines at 6 o'clock and 12 o'clock.
- Place a 1.5 inch piece of glass tape over the foot of the 12 o'clock wedge. *Do not allow the wedge or tape to contact the coated area around the anode lead.*
- While viewing the 6 o'clock and 12 o'clock areas on the screen, rock the front of the yoke horizontally (left/right) to converge the red and blue horizontal lines. Temporarily place wedges at the 4 o'clock and 8 o'clock positions to hold the horizontal position of the yoke.
- Check the 3 o'clock and 9 o'clock areas to confirm that the red and blue vertical lines are converged. If the lines are not converged, slightly offset the horizontal tilt of the yoke to balance the misconvergence of the vertical lines at 3 o'clock and 9 o'clock with the misconvergence of the horizontal lines at 6 o'clock and 12 o'clock.
- Place a 1.5 inch piece of glass tape over the foot of the 4 o'clock and 8 o'clock wedges.

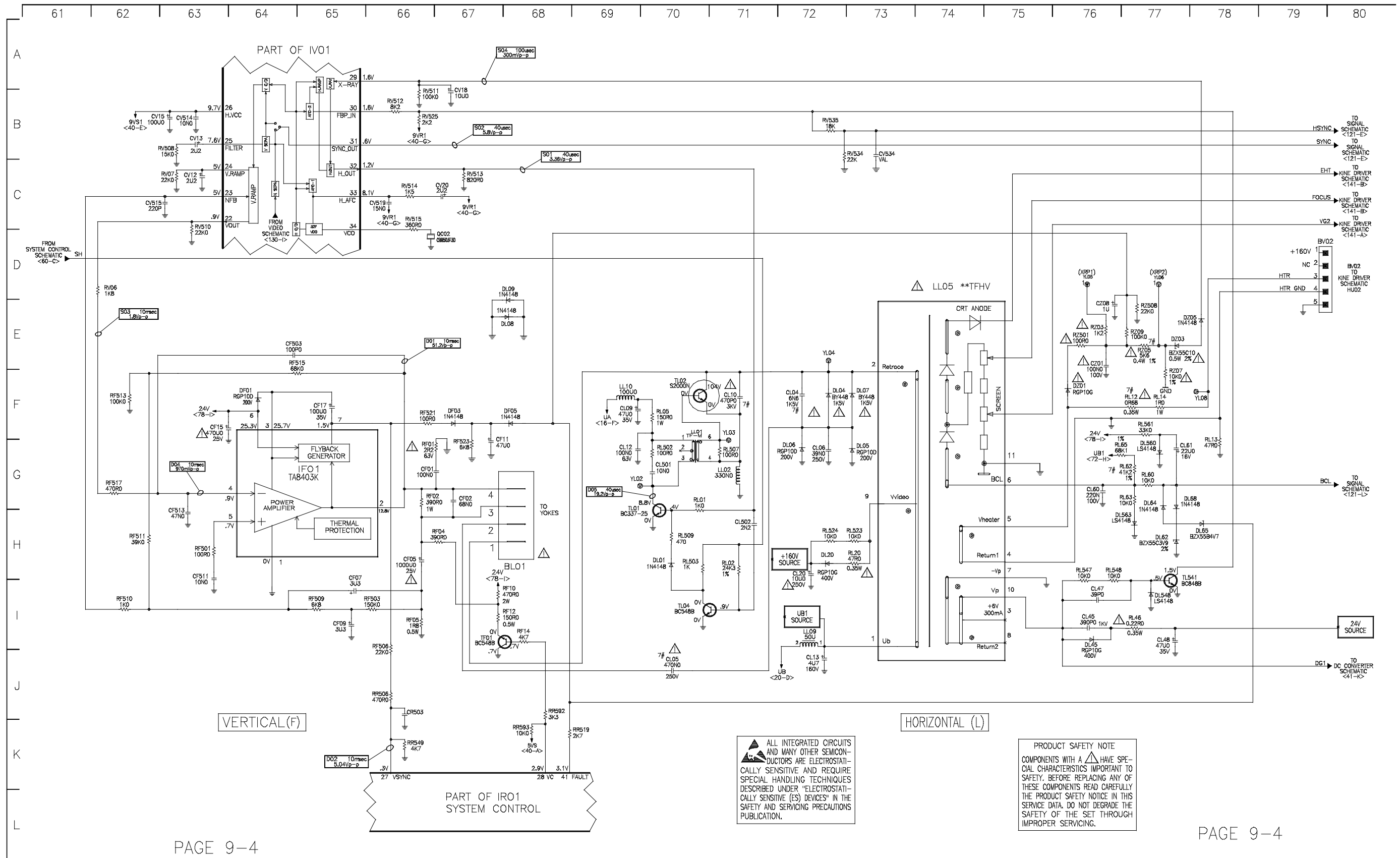




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DEFLECTION SCHEMATIC



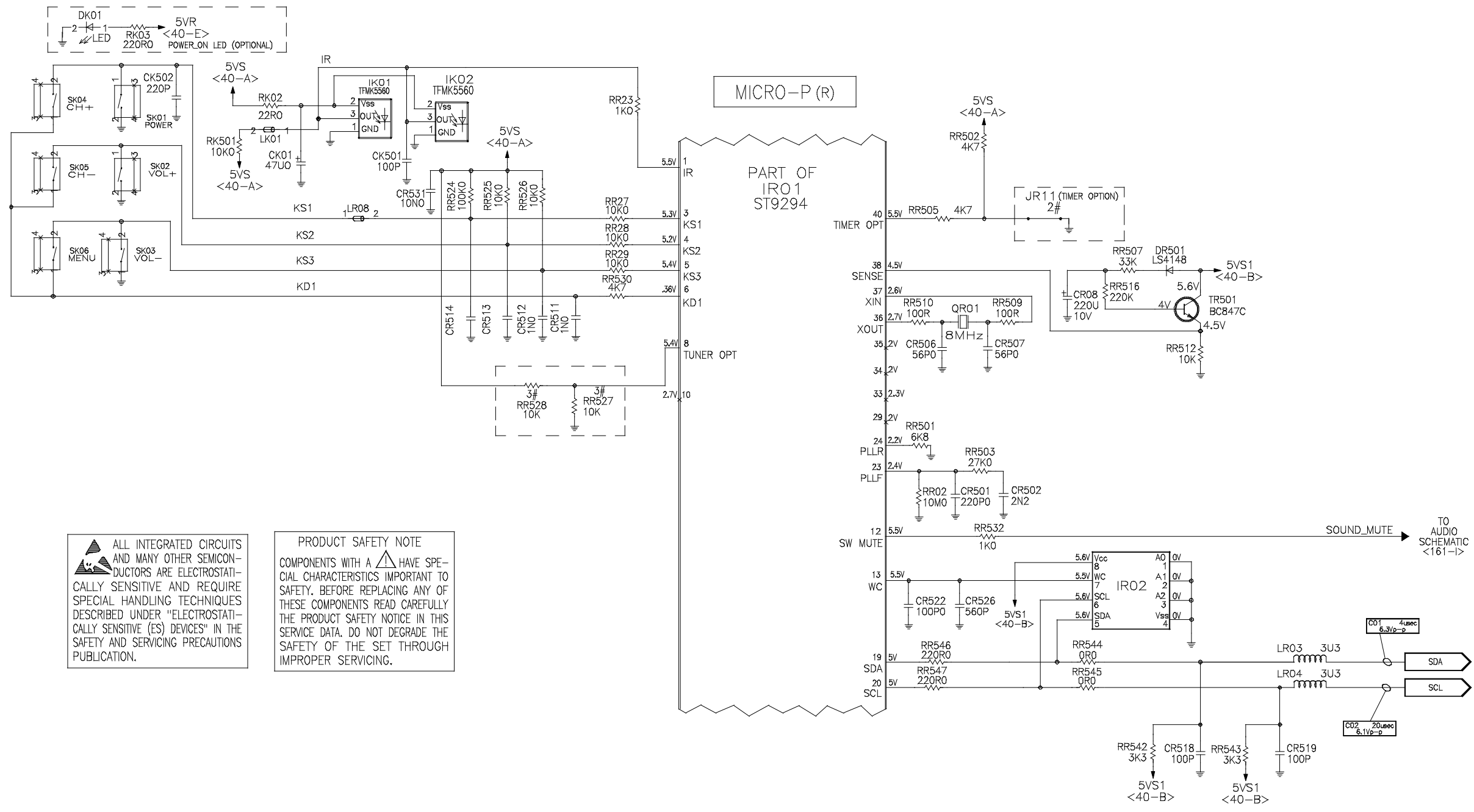
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SYSTEM CONTROL SCHEMATIC

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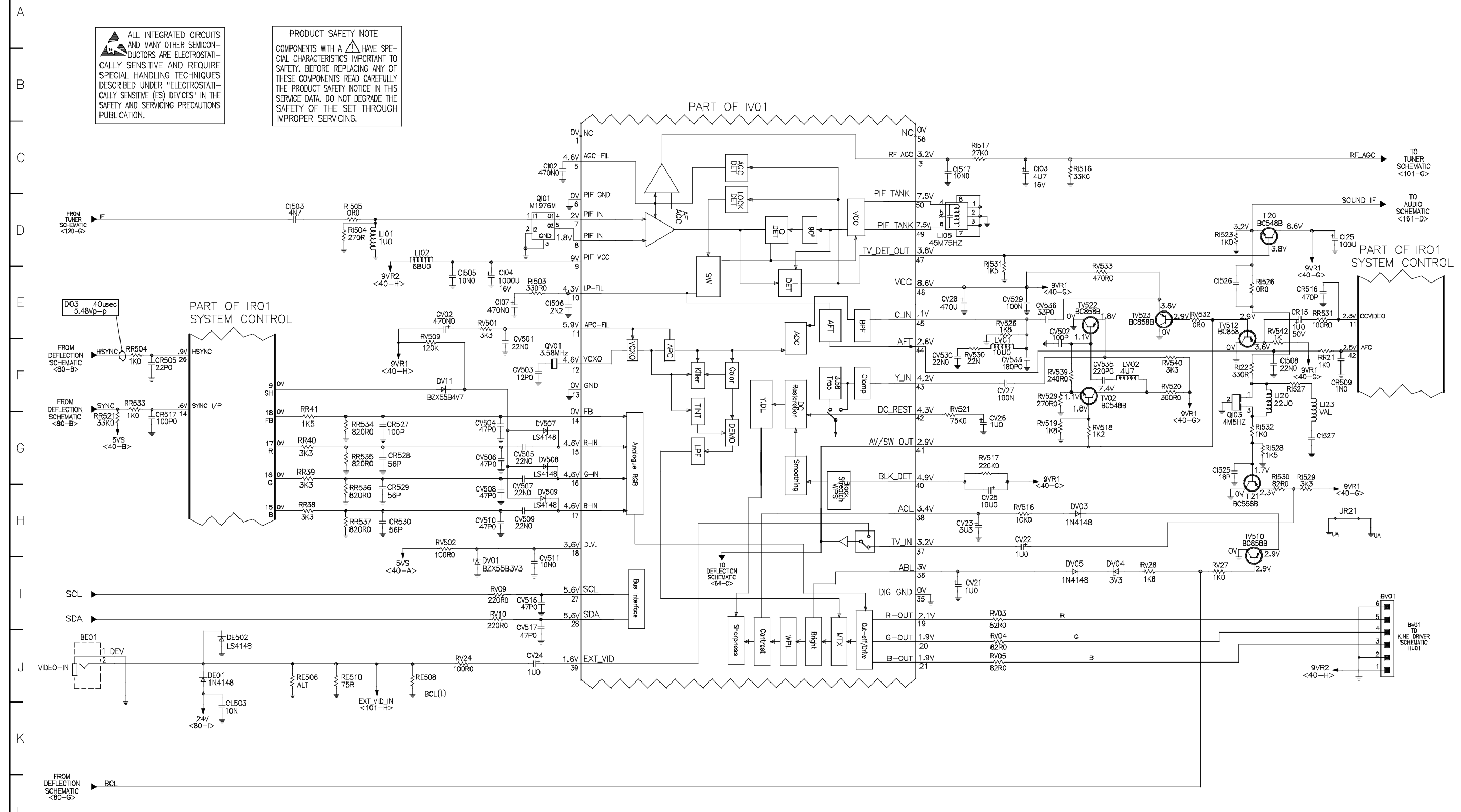
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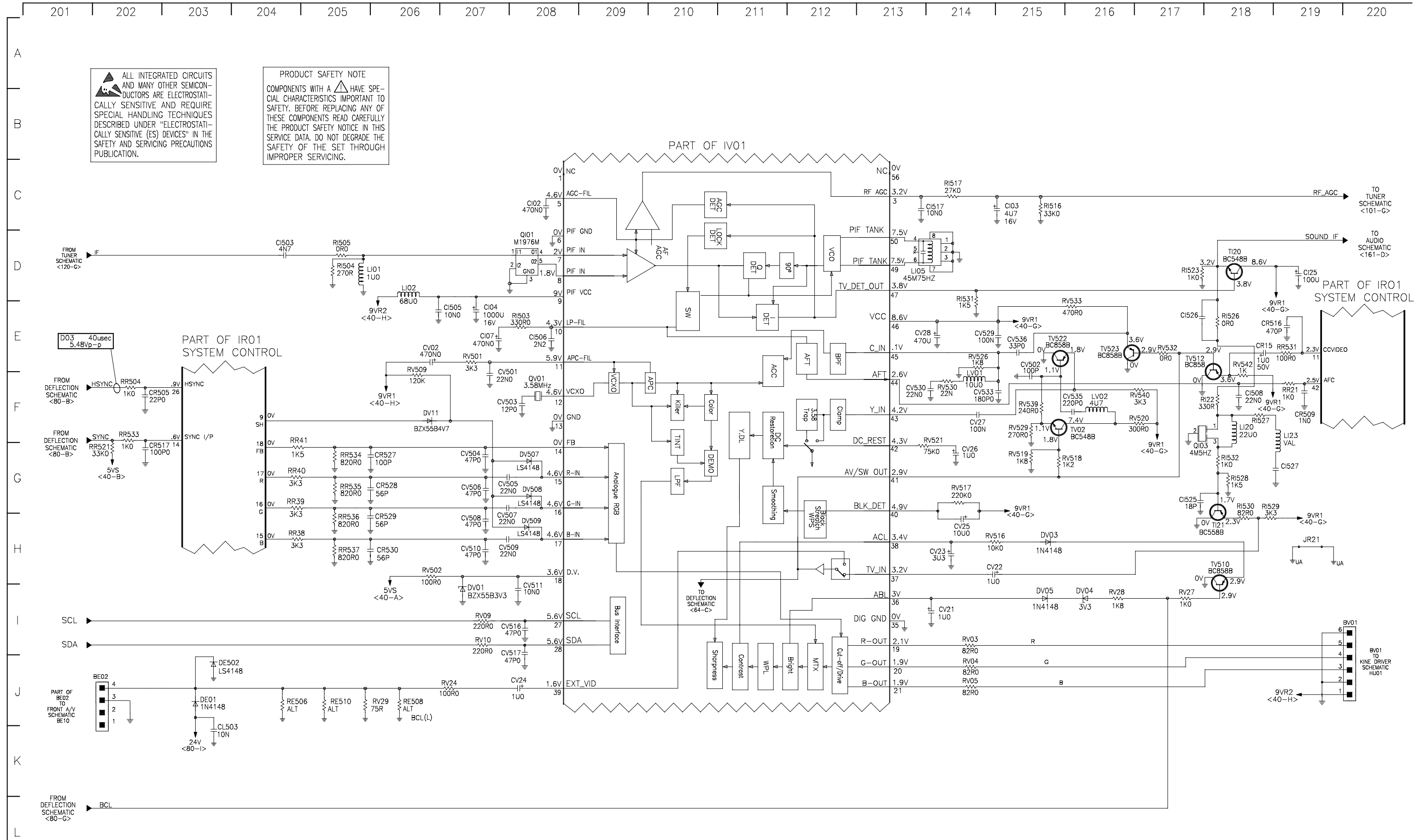
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PART OF IRO1 SYSTEM CONTROL

PART OF IV01

PART OF IRO1 SYSTEM CONTROL



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PART OF IR01 SYSTEM CONTROL

PART OF IV01

PART OF IR01 SYSTEM CONTROL